be convinced that helping their child maintain appropriate weight is vitally important to decrease adverse health effects in adulthood.

Prevention of perioperative thromboembolism in patients with atrial fibrillation

Beldi G, Beng L, Siegel G, Fisch-Knaden S, et al. Brit J Surg 2007;94: 1351-5.

Conclusion: Compared with postoperative anticoagulation with low-molecular-weight heparin (LMWH), postoperative anticoagulation with therapeutic unfractionated heparin (UFH) in patients receiving long-term anticoagulation is associated with an increased risk of bleeding and does not reduce the risk of thromboembolism.

Summary: This was a retrospective study designed to test the safety and efficacy of two methods of prophylaxis for perioperative thromboembolism in patients with atrial fibrillation (AF), which was present in 1.9% of patients undergoing 14,801 operative procedures. Patients with AF who were not receiving oral anticoagulation (n = 146) were placed on the LMWH nadroparin before and after surgery (40 U/kg). Those patients with AF who were on anticoagulation before surgery (n = 136) were placed on intravenous UFH postoperatively at a dose to maintain therapeutic levels.

Arterial or venous thromboembolism occurring in the perioperative period was independent of pre-existing risk factors. Atrial or venous thromboembolism occurred in 4.6% of patients, without significant differences between the perioperative use of LMWH or UFH ($P = .78$). Thromboembolism was significantly associated with increased perioperative mortality (odds ratio, 9.5; 95% confidence interval, 2.5-35.8, $P = .001$). Postoperative bleeding occurred in 4.8% of patients treated with LMWH and in 17.6% of patients treated with UFH ($P < .001$).

Comment: Patients on long-term anticoagulation for AF often must have anticoagulation interrupted for an operative procedure. During this time, anticoagulation is generally "bridged" with heparin until vitamin K antagonists can be restarted. The study is important in that it indicates this "bridging" of anticoagulation is probably best performed with LMWH, rather than UFH. Although this was a study of general surgical patients, it is likely that differences may be even more dramatic in patients undergoing vascular surgery.

Preoperative cerebral hemodynamic impairment and reactive oxygen species produced during carotid endarterectomy correlate with development of postoperative cerebral hyperperfusion

Suga Y, Ogasawara K, Saito H, et al. Stroke 2007;38:2712-2717.

Conclusion: Reactive oxygen species, which are produced during carotid endarterectomy (CEA), and preoperative cerebral hemodynamic impairment correlate with development of cerebral hyperperfusion after CEA.

Summary: The authors sought to determine the relationship between production of reactive oxygen species and preoperative cerebral hemodynamic impairment with postoperative cerebral hyperperfusion in CEA patients. Malondialdehyde-modified low-density lipoprotein (MDA-LDL) is a marker of oxidative damage that can be measured in serum samples. Cerebral hemodynamic impairment can be measured using single-photon emission computed tomography (SPECT) to assess cerebral blood flow and cerebrovascular reactivity with acetazolamide. In this study, 90 patients who underwent carotid endarterectomy for ipsilateral internal carotid artery stenosis >70% were assessed with MDA-LDL levels, as well as preoperative SPECT. Hyperperfusion was defined as a cerebral blood flow increase of >100% compared with preoperative values.

After CEA, hyperperfusion was documented by increased cerebral blood flow in 12 patients (13%). Logistic regression analysis determined that reduced preoperative cerebrovascular reactivity (95% confidence interval, 1.053-1.453; $P = .0097$) and an increase in MDA-LDL after internal carotid artery clamping (95% confidence interval, 0.862-0.980; $P = .0098$) were associated with development of postoperative cerebral hyperperfusion. Of the 11 patients with reduced preoperative cerebrovascular reactivity and increased MDA-LDL after internal carotid artery clamping, post-CEA hyperperfusion developed in 10, and two of these had cerebral hyperperfusion syndrome.

Comment: It is known post-CEA hyperperfusion syndrome correlates with reduced preoperative cerebrovascular reactivity. However, hyperperfusion syndrome does not develop in all patients with reduced preoperative cerebrovascular reactivity (52% in this study). The addition of MDA-LDL levels to the preoperative assessment of cerebral blood flow in patients at risk for post-CEA hyperperfusion syndrome may help more precisely identify patients at risk for postoperative CEA hyperperfusion syndrome.

Involvement of MMPs in the outward remodeling of collateral mesenteric arteries

Haas TL, Doyle JL, Distasi MR, et al. Am J Physiol Heart Circ Physiol 2007;293:H2429-37.

Conclusion: Matrix metalloproteinase (MMP) activity is essential to the remodeling process that leads to luminal expansion associated with collateral vessel enlargement.

Summary: Shear stress is important in collateral enlargement. Elevations in shear stress within resistance or conduit arteries result in luminal expansion. The result is normalization of shear stress and maintenance of flow to the downstream vasculature. This process involves remodeling of the extracellular matrix and cellular proliferation; however, specific cellular events leading to these events are poorly understood. It is known that MMPs contribute to the remodeling of the extracellular matrix in vein grafts and conduit vessels exposed to high flow rates. This study sought to evaluate the role of MMPs in remodeling of small collateral arteries exposed to increases in shear stress.

The authors used an established model of outward remodeling of mesenteric collateral arteries that utilizes ileal arteries of male Wistar rats that are surgically ligated to produce a collateral-dependent region. They sought to determine whether MMPs were up-regulated during remodeling and to test whether MMP activity was required for luminal expansion. After 2 to 7 days, arteries were harvested and MMP9 and MMP2 levels determined using standard gelatin zymography and immunostaining. At 4 days, membrane type 1 MMP (MT1-MMP) and MMP2, but not MMP9, protein levels were elevated in collateral arteries. The elevated MMP proteins, along with their respective transcriptional activators, were predominately localized to the smooth muscle layer of the collateral arteries. Doxycycline, a general MMP inhibitor, prevented luminal expansion of collateral arteries but did not affect medial growth responses or endothelial cell proliferation.

Comment: This study may serve as the basis of a new approach to improving distal circulation in situations where the primary conduit arteries are stenosed or occluded. Perhaps enlargement of collateral vessels through an MMP mechanism can serve as an alternative to angiogenesis in patients with severe intermittent claudication or critical limb ischemia.

Increased mortality, postoperative morbidity, and cost after red blood cell transfusion in patients having cardiac surgery

Murphy GJ, Reeves BC, Rogers CA, et al. Circulation 2007;116:2544-52.

Conclusion: In patients having cardiac surgery, red blood cell (RBC) transfusion is associated with increased rates of ischemic postoperative morbidity, infection, and early and late mortality, as well as increased hospital lengths of stay and hospital costs.

Summary: The authors sought to quantify clinical outcomes and costs with RBC transfusion in patients having cardiac surgery. Databases for clinical hematology and blood transfusions were linked with the United Kingdom population register. Hematocrit information was obtained from intensive care unit charts. Prespecified primary end points were composite infection (wound infection, septicemia, or respiratory infection) and ischemic outcomes (renal impairment from ischemic injury, myocardial infarction, or stroke). Resource use, cost, and survival were secondary outcomes. Regression modeling with adjustment for potential confounding variables was used to determine associations between transfusion and the primary and secondary outcomes.

Patients were derived from the Bristol Royal Infirmary database of adult cardiac surgery patients. This included patients having cardiac surgery from April 1, 1996, to December 31, 2003. Adjusted odds ratio for ischemic outcomes (832 of 8518) and for composite infections (737 of 8516) were 3.35 (95% confidence interval [CI], 2.68-4.35) and 3.38 (95% CI 2.60-4.40) respectively. Relative cost of admission was increased by any transfusion at a rate of 1.4 times for transfusion (95% CI 1.37-1.46), varying from 1.11 for 1 U to 3.35 for >9 U transfused. At any time after operation, patients with transfusion were less likely to have been discharged from the hospital (hazard ratio [HR] 0.63; 95% CI, 0.60-0.67) and more likely to have died (0 to 30 days: HR, 6.69; 95% CI, 3.66-15.1; 31 days to 1 year: HR, 2.59; 95% CI, 1.68-4.17; >1 year: HR, 1.32; 95% CI, 1.08-1.64).

Comment: Transfusion is known to be strongly associated with infection. In this study however, transfusion was also strongly associated with increased hospital costs and poorer long-term prognosis. A most surprising finding was that ischemic outcomes were made worse by transfusion, inconsistent with a widely held belief that RBC transfusion improves tissue oxygenation. It appears another accepted truth in medicine is once again no more than a half-truth and probably less than that. In fact, we have a very poor understanding of the indications for RBC transfusion. These data certainly imply that we are transfusing too many patients and not only wasting money but also adversely affecting the patients.